

Anno Domini. 1592.

A briefe Treatise for the
ready vse of the Sphere : Lately
made and finished in most ample
large manner.

By Robert Tanner Gentleman,
Practitioner in Astronomie
and Phisicke.

*In the Which Globe or Sphere, there
is added many strange Conclusions, as wel Cæ-
lestiall as Terrestiall, the like heeretofore neuer
deuised by any. Necessary not onely to those
that foliwe the Arte of Nauigation:
But also to the furtherance of such
as bee desirous to haue skill
in the Mathematicall
Disciplines.*

Thou O Lord in the beginning hast
laid the foundations of the earth : and
the heauens are the woorkes of thy
hands. *Psalme. 102. ver. 25.*

1162



To the most high, mightie & renowned Princessse, and most dread redoubted Soueraigne Ladie ELIZABETH, by the grace of God Queene of *England, Fraunce, and Ireland*, Defendresse of the faith.



MOST Excellent, gracious, and sacred Soueraigne, I was mooued to take in hande to compyle out vnto your Highnes (so well as my simple learning would
.. 3 serue

The Epistle

*serue me) a brieft Treatise for the
readie vse of the Spheare or Globe:
A worke, by your poore obedient
subiect, with great paines, labour,
and studie, made and inuented:
with sundrie additions and formes,
not heeretofore deuised by anie: no
lesse pleasant than profitable for the
benefite of your Highnes Common-
weale, to the studious in the Ma-
thematicall Sciences, and to the
furtheraunce of Trauellers in the
Arte of Nauigation, and to all
o:her your Highnes subiectes that
are desirous of the knowledge of
the beautifull frame of the Cele-
stiaall Orbes with their quantities,
distances, courses, and strange in-
tricate*

Dedicatorie.

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tricate miraculous motions of the
resplendant Globes of the Sunne,
Moone, Planets, and Starres
fixed. And where it is a thing
grafted in Nature, and naturall
through custome (right renowned
Princesse) by manifolde sundrie
meanes, either by the faculties of
the mind, the qualities of the bodie,
or the gifts of fortune, for men that
are led on by inward affection, to
seeke the friendship of those whom
they affectionate, or rather in-
wardly loue: Wherein euerie man
is so liberall, as the giftes of the
minde, bodie, or fortune will af-
foord him. Wherein, although I
am not so farre, endued with anie of
them,

∴ 4

The Epistle

them, that thereby I may deserue
anie thing at all: and although the
gistes of my minde are vnperfect,
if they bee placed against such an
obiet, (as without assentation bee
it spoken) your *Maiesties* Royall
selfe is; yet weighing with my self,
the bountifull goodnesse of your
Highnes nature to resemble a roy-
all and fruitfull Tree, which the
more it is loaden, the more it decli-
neth: and the naturall gentlenesse
and royal clemencie of your *Ma-
iesties* courtesie, wherewith your
Highnes is wont to receiue fauou-
rablie, to conceane and iudge roy-
ally, of whatsoener your *Maiesty*
perceiueth, either to be over-slipt by
negli-

Dedicatorie.

negligence, let passe by infirmitie, or inserted by ignorance. And considering likewise the Prouerbe: *Candidæ Musarum ianux*, the doores of the learned are free from enuie: I purposed by these small fruites of my skill, to make attempt if I could win anie fauourable acceptance, within the clemencie of your Highnes fauourable protection. Perswading my selfe, that I might safely commit my rude work to the presence of your Royall Maiestie, who will wisely winke at my wants, and honorably construe the good meaning of my munde. And the more willing was I ledde on to seale it, and as my faithfull alleageance

The Epistle

ance bindeth me like a dutifull and obedient subiect, to chose out your Highnes most royall worthines above all other Princes, vnder the Orbes of the Heauens, to present this small worke of mine: because your Maiestie can learnedlie iudge of that which the ignorant can not comprehend. The onely name of your Highnes royall sacred Maiestie, shall be vnto me a sure target of Steele, to beate backe the glauncing strokes of vnskilfull tongues: Who when they can not find out, by naturall reason, the quantitie and qualitie of superiour bodies, will utterly condemn the rules of Arts, and quite overthrow al euident demon-

Dedicatorie.

monstrations : against whom (because they denie principles) there is no reasoning nor disputing at all.

If I should stand upon termes of Arte, and goe about to unlock the closet of Astronomie unto your Highnes, whom I know sufficient of your royall selfe to wade through the deepest flouds and swiftest streames contained in the *Mathematikes*: your Maiestie might iustly saye, *Sus docet Mineruam*; & I might rather discover that I want, than your Highnes want that which I set downe. It is better therefore for me to bee silent, considering with what a wise, learned, royall Princessse I haue to deale, than by need-
lesse

The Epistle

lesse words to open mine owne defects : humbly crauing pardon of your Maiestie for this my bold enterprise hoping that your Highnes will not mislike this simple signifying of my bounden duetie. For like as the myte of the poore Widdowe mentioned in the holie Scriptures, which she gaue in all her penurie, is accompted a greater gift than those huge summes that great men laud out of their great store : So this my rude Edition of my simple handy worke, if it may be accepted into your Highnes tuition, it shal encourage mee heereafter to practise workes of greater importance; and (as it is my bounden duetie) al-

Dedicatorie.

waies to praye to the Almighty
God to blesse and keepe your Maie-
stie in health, tranquillitie & peace,
So my daylie prayer is to the same
God, to blesse and defend your
Highnes from all your enemies, and
to raigne and liue ouer vs Nestors
yeares.

Your Maiesties

most humble subiect,

Robert Tanner.







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*In the which Globe or Sphere, there
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lestiall as Terrestiall, the like heere tofore neuer
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that followe the Arte of Navigation:
But also to the furtherance of such
as bee desirous to haue skill
in the Mathematicall
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**Thou O Lord in the beginning hast
laid the foundations of the earth: and
the heauens are the woorkes of thy
hands. Psalme. 102. ver. 25.**



And nowe to begin howe to erect the Sphere or Globe.

*But first, the definition what a
Sphere is, with his partes, are to be
known and found out.*

A Sphere is a massie body, inclosed with one platforme; and in the middle of it ther is a pricke: from which, all lines drawne to the said platforme, are equall each to other, and that pricke is the Center of the Globe, and so sayth *Enclid.*

The Axeltree is a right lyne (which mooueth not) and passeth through the Center of the Globe, at which ends are imagined the Poles of the world; one is named the North Pole, the other the South.

The North Pole is called, *Pole Artick*, and the other Pole in the the South, *Antarticke*: the South Pole is neuer seene of vs in this our Countrey, but is euermore vnder our Horizonte. The North Pole is alwayes seene of vs whereas wee dwell, and these starres be opposed the one right against the other.

The

The Meridian is a great Circle passing over our heades, in which Circle when the Sunne is, hee maketh the middle of the day and the middle of the night. And also, in this Circle is shewed the Latitudes of all places, by the height of the Poles, in euery seuerall Latitude.

The Horizont what it is.

The Horizonte is a Circle, which goeth a-long by the edge of the ground, and parteth the part of the world which we see, from that part which we see not; and when the

Sunne riseth, then he is in our Horizonte, and so is he when he is going downe as lowe as wee can see him.

Also it deuidenth the whole Sphere of the world into two equal parts, in such sort, that halfe of the Sphere is euer aboue the ground, and halfe alwayes vnder the earth. This Circle hath great vse in the heauenly motions, that by it wee iudge the rysings & settings of the Sunne and Moone, and all other Starres; And in this Horizonte you shall finde noted, the names of the winds, which the Marriners vse, by the 32. poynts of the Compas.

The

The next Circle is noted, the degrees which euery day in the moneth dooth contayn : that is to say, the first day one degree ; the second day two degrees; and so forth as they succeed in order, to a point like a little starre, where the last day of euery moneth endeth.

The next Circle sheweth, what day of the moneth the Sunne entreteth into any of the twelue signes, telling euery day one degree, to thirtie degrees, & so they succeed through euer one of the twelue signes, monethlie.

This *Horizonte* is deuided into foure quarters, East, West, South, and North, euery quarter of the world contayneth 90. degrees: and the whole compasse therof, is 360. degrees.

The next Circle is *Motus trepidationis*, a starry firmament, whose motion is slowe, from the West to the East, that euery hundreth yeere (by the obseruatiō of diuers Astronomers) moueth but one degree.

The *Zodiacke*, is a great broade and slope or shoring Circle, in the which are depicted the twelue signes and fixed starres, in the
middest

middest whereof, is the Eclipticke
lyne, from which the Sunne neuer
fwarueth.

Then followeth the two Col-
lurs, and the Equinoctiall Circle,
parting the Sphere in the verye
middest, betwixt the two Poles: by
reason whereof, there are two La-
titudes, the one is North and the o-
ther South.

The North Latitude is contay-
ned betwixt the Equinoctiall and
the North Pole; the South Lati-
tude, is betwixt the Equinoctiall
and the South Pole: either of these
two spaces contayneth in bredth
90. degrees.

A Degree is one part of a Circle beeing deuided into 360. parts, and 360. degrees, is the very Longitude of the Earth : and at the furthest Meridian in the West, beginning with one degree, and so proceede Eastward, vnto 180. degrees of the Equinoctiall, & from thence goe forward to the West, where you come againe to 360. degrees, which is the last degree of Longitude.

*Next followeth the two
tropicall Cyrcles.*

That is to say, the North tropicke
is

is *Cancer*, and is the returne of the the Sunne in Sommer declining, backe againe towardes the Equinoctiall, the dayes being then at the longest, and the nights at the shortest with vs, and then beginneth the dayes to shorten againe.

The Winter Tropicke (sayth *Proclus*) is the most Southerliest Circle of all them that the Sunne dooth describe, by the reuolution of the world, in the which when the Sunne is, he maketh his winterlie turne, and then is the longest night in all the yeere and shortest day with vs.

Para-

Paralels.

The Paralell lynes are described by the wyers in the Globe, and a Paralell of the longest day, is a space of the Earth : by thys is knowne the increase of the day to be a quarter of an hower, going from the Equinoctiall towards any of the Pole starres.

A Clymate contayneth two Paralels, in which spaces the day increaseth by halfe an hower : Of these Paralels are made 24. Climates, betweene the Equinoctiall and the tropicke of *Cancer*.

The

*Then followeth the Artick Circle,
and the Antartick
Circle.*

The Artick Circle is the North Circle: and the contrary Circle in the South, is called the Antartick Circle: by the which Greeke composition, as you would say, contrary or against the Articke Circle, & it well may bee called the South Circle. But now heere how *Proclus* defineth them.

The Articke Circle is the greatest of all those Circles which doe alwayes appeare, and toucheth the
Hori-

Horizonte in one only poynt, and is altogether about the Earth, and all the starres that be within this Circle neyther rise nor set, but are seene to runne round about the Pole all the night.

The Antarticke Circle is equall & equidistant to the Artick Circle & toucheth the Horizonte in one onely poynt, and is all vnder the ground, & all the starres that be in it, are euermore out of our sight.

Then is there two other smaller Circles, called Poller Circles, or Pole Circles: in this Circle about the Antartick Pole, is deuided certaine

rayne degrees to take the Altitude of the North starre, this starre is in the extremitie, or end of the tayle of the lesse Beare, being a constellation, commonly called the Horne : for this North starre (of the most notablest starres aboue the Pole) is neereſt vnto it, & ſhall therefore ſhewe a lesse Circle than any other, and ſo ſhall his Altitude differ little from the Altitude of the Pole.

This starre hath declination 85. degrees, and 51. minutes, and the complement of nintie (which are foure degrees and nine minutes) is his diſtance frō the Pole. And although

though the Marriners hold opinion, that it is not distant more than three degrees & a halfe, yet to the iudgmēt of those persons that hath knoweledge in Astronomie, more credite ought to be giuen to the Astronomer than to the Marriner, for asmuch as the Astronomer doth know the place of the starres, with their Longitudes, Latitudes, declinations, and right ascensions, more perfectly and precisely than dooth the Marriners: for they accompt not onely by degrees, but also by minutes and seconds; therefore whosoeuer wil precisely know it, let him take the highest Altitude of the North starre, which is
his

his beeing ouer the Pole , and the
 lesse Altitude, which is his beeing
 vnder the Pole: then take away the
 lesse from the more, and the halfe of
 that remayneth, shalbe the distance
 of that starre, from the Pole of the
 world, And likewise by thys expe-
 rience may be known the Altitude
 of the Pole, and what all the other
 starres that goe not downe vnder
 the Horizonte , be distant from it,
 ioyning the greater Altitude with
 the lesse : and that shall amount
 thereof, deuided by the halfe, shall
 bee the Altitude of the Pole ;
 and taking awaye this Altitude
 of the Pole, from the greater Altitude
 of the Starre , or the lesse

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from

from the Altitude of the Pole, the rest that remayneth, shal be the distance of the starre from the Pole. And as the Pole is inuisible, it can not be seene or known when the North starre is higher & lower, except it be by the meane of some other marke. And for this is considered, the position of the former Guardes or Watch, beeing one of the two starres called the Guardes, which are in the mouth of the Horne: the Marriners haue noted eyght positions, from the former Guard starre to the North starre, which aunswereth to the eyght principall windes; and as the Guard is to the North starre, ac-

cor-

according to the placing of these positions, so it shall be higher and lower from the Pole.

Let vs heere put the common Rules which the Marriners vse, to compile with those that are of opinion of three degrees and a halfe.

And for the opinion of Astronomers, (which is the distance of 4. degrees & 9. minutes) I haue in my Sphere or Globe annexed to my Diall in the North end, a Circuler or Figure with a moueable Horne; Vppon the vttermost Margent of the Diall, is noted the eyght winds of the eyght positions, and also the other points belonging to the Ma-

riners Compas, and putting the Guardes and the North starre in e-
 uery of the Windes, it shall be the
 distance that the North starre is
 higher and lower than the Pole,
 as by the thrid appeareth in the
 cutting of the degrees in the Pole
 Circle, when the Horne is mooued
 too and fro.

*Common Rules after the Marri-
 ners acompt, but not after the A-
 stronomers acompt, as may
 appeare in the Rules
 next before.*

THE former Guarde being in
 the East, the North starre is
 one

one degree and a halfe vnder the Pole.

The Guard being in the North-east, the North starre is three degrees and a halfe vnder the Pole.

The Guarde being in the North, the starre is three degrees vnder the Pole.

The Guard being in the North-west, the starre is halfe a degree vnder the Pole.

The i Guarde in the West, the starre is one degree and a halfe aboue the Pole.

The Guard in the South-west,
the starre is three degrees and a
halfe about the Pole.

The Guard in the South-east,
the sayd North starre is halfe a de-
gree about the Pole.

And thus in the Dyall and the
Circle about the same, may you see
the North starre, in what part it is
of the degrees, high or lowe, from
the Pole: not onely by the Marri-
ners Rule, but also by the Astrono-
mers Rule.

And being thus knowen, howe
much

much the North starre is vnder & aboue the Pole, let vs take the Altitude thereof.

And that of it that is vnder the Pole, let vs ioyne to his height, and as much of it as is aboue, let vs take away, and that shall rise therof, shall be the Altitude of the Pole aboue the Horizonte.

Thus much for breuitie sake, I haue borrowed and collected out of *Martine Cortese*, and other good Authors, these fewe notes, for the vse of the Guardes, fixed in the North end of my Sphere or Globe. And nowe I am to intreate of the inwarde part of the Coelestiall

B 4

Globe

Globe, and also of the Terrestiall Globe; and to beginne with the lowest first.

The Terrestiall Globe hath depicted vpon it, a Mappe or Cart of the description of all the Earth, and the chiefeſt Regions, Citties, and Townes vnder *Europe*, *Affrica*, *Asia*, and *America* : And in thys Globe is contayned two Elements, that is to ſay, *Earth* and *Water*. The *Earth* is loweſt of all Elements, black, ponderous, round, inuironed and incloſed with the other three; ſhe is called the Mother of fruits, the roote of all plantes, the nourſe of lyuing Creatures, the foundation
of

of buildings, the Sepulchre of the dead, the Center of the beautifull frame of the world, the matter and substance of mans body, and the Receptackle of heauenly influence: she is also garnished with fragrant flowers, with beautifull collours of Man, Beast, and Foule, inhabited, and comfortably quickned by the nourishing beames of the Sunne, Moone, Planets, and fixed starres.

The Earth in comparison to the whole world, is but a pricke or mote, the whole compas thereof, is 360. degrees, & euery degree is 60. myles: and yee multiply 360. degrees by 60. it yeeldeth 21600. miles

myles about the same.

The next Cyrcle aboue the Terrestiall Globe, is the Element of *Ayre* : and the next Region aboue the *Ayre*, is the Element of *Fyre* : and there are the foure Elements, described in this Sphere or Globe.

Then ensueth the Spheres of the 7. Plannets : that is to say, the first is the Sphere of the Moone : the second is the Sphere of *Mercury* : the third is the Sphere of *Venus* : the fourth is the Sphere of *Soll* : the fift is the Sphere of *Mars* : the sixt is the Sphere of *Jupiter* : the seauenth is the Sphere of *Saturnus* :
the

the eyght is the Sphere of the starrie Firmament; and euery one of these Spheres dooth carrie hys signe and Character vpon him.

And according to the common accompt, the Earth is 39. times so much as the Moone. But the Sphere of the Moone is farre bigger than the Globe of the Moone, & the semidiameter of her Sphere, is 33. times $\frac{1}{2}$. longer than the Earthes semidiameter, & the myles of the semidiameter of her Sphere is 115278. and the myles of her Sphere in compasse, contayneth 724604. 4

7.

The semidiameter of the Sphere
of

of *Mercury*, is 64. tymes so long as the Earthes semidiameter : the miles of the semidiameter, containes 220500. $\frac{2}{33}$. And the myles of his Sphere in compasse, contayneth 1386000. $\frac{4}{31}$.

The semidiameter of the Sphere of *Venus*, is 167. tymes so long as the Earthes semidiameter: the miles of the semidiameter, contayneth 573872. $\frac{3}{11}$. the myles of the Sphere in compas, contayneth 3607200.

The semidiameter of the Sphere of the Sunne, is 1120. tymes so long as the Earthes semidiameter: the myles of the semidiameter, contayneth

neth 3848367. $\frac{3}{11}$ the myles of hys
Sphere in compasse, contayneth
34189737. $\frac{1}{7}$.

The semidiameter of the Sphere
of *Mars*, is 1220. times so long as
the Earthes semidiameter: the
myles of the semidiameter, contay-
neth 4192363. $\frac{7}{11}$. the miles of the
Sphere in compasse, contayneth
26352000.

The semidiameter of the Sphere
of *Jupiter*, is 8876. times as long as
the Earths semidiameter: the myles
that the semidiameter contayneth,
is 30501163. $\frac{7}{11}$. the myles of the
Sphere in compasse, contayneth
191721600.

191721600.

The semidiameter of the Sphere of *Saturne*, is 14405. times so long as the Earthes semidiameter : the myles that this semidiameter containeth, is 4950318. $\frac{2}{11}$. the myles of this Sphere in compas, containeth 311148000.

The semidiameter of the eyght Sphere, is 20110. times so long as the Earthes semidiameter : the myles that this semidiameter containeth, is 69105272. $\frac{11}{8}$: the miles of this Sphere in compasse, containeth 434376000.

In

In this Armill or Ring Sphere,
 are wonderfull conclusions to bee
 learned, very strange and maruel-
 lous to the simple & ignorant per-
 sons, voyd of thys knowledge, no
 lesse profitable than commendable
 to them, and to the skilfull & wise;
 for the vse thereof is very apt and
 ready in teaching, and is more easie
 for young learners, than the Sol-
 lid or Massie Globe. And this is a
 maruellous excellencie in know-
 ledge, to bee able so certaynly to
 iudge of things absent, as if they
 were present, to be able to tel what
 hower of the day it is in all parts of
 the Earth, and when the Sunne ry-
 seth and setteth in all places vnder
 hea-

heauen : for the howers of the day
 are dyuers in dyuers Regions; so is
 the shaddowes that the Sunne
 causeth in their Dyalls, and all o-
 ther shaddowes doth disagree ma-
 ny wayes, not onely from our shad-
 dows, but also, one of them from
 another. Agayne, the tymes of the
 yeere are not a-lyke through all
 the world, but when it is Sommer
 to vs, it is winter to some other, and
 when it is Spring-tyme with vs, it is
 Sommer in another Countrey;
 and when it is Haruest with vs, o-
 ther people haue Sommer : so whē
 it is winter with vs, some Nations
 haue Sommer, yea, when Spring
 time beginneth with vs, it is Har-
 uest

uest in some Countreyes, and in o-
ther Countreyes it is Midsommer
at the same time : but when it is
Midsommer with vs, it is Haruest
nowhere in the world, but middle
Winter it is then in two dyuers
parts of the world.

And those people whose *Zenith*
is within 23. degrees and a halfe of
any of the Poles, haue their shad-
dowes running round about them:
and the neerer they dwell vnder
the Pole, the longer is their day,
and therefore dooth their shad-
dowes run the oftner about them;
for where the day is but 24. howers
long, there the shaddowes runneth
but once about : and where it is
C 1 halfe

halfe a yeere long, there it runneth about 103. tymes, and in all other meane places accordingly ; so that those people that haue these shaddowes thus running about them, vnder the North Pole. Then they that dwell vnder the South Pole haue no shaddowes at all, for it is continuall darknes with them: and yet doe they not want lyght although they lacke the Sunne , but only halfe a moneth together, when the Moone is in that halfe of the Zodiake which is out of their Horizont. And though the Sunne and Moone be out of theyr sight, ye see with vs, that we haue a light before Sunne rysing , and after the Sunne set.

setting: so haue they such a light by the beames of the Sunne, 50. dayes continually, after they haue lost the sight of the Sunne, and so haue they like light 50. dayes together before the Sunne dooth rise to them. And when the Sunne is at the highest with vs, it is at the lowest with diuers other Nations, namely, to all them that dwell vnder the Equinoctiall directly, or South from it; And therefore all those Nations haue Mid-winter when we haue Midsommer.

*Nowe followeth, how to erect
the Sphere.*

First, for the vse of the same, you must place and set your Sphere leuill, that it may stand vpright, and by the needle in the compas in the foote thereof, let it be placed due North and South, then shall the Articke Circle stand North and the Antarticke South.

The next Rule, is to find out the eleuation of the Pole of the heauē, in that place wher you mind to obserue the Sphere for, & this being knowne, then turne your Meridi-
an

an Circle, and rectifie the Pole of the Sphere, so many degrees aboue his Horizont, as the Pole of the heauen is eleuated, in the place where you will obserue the same. Then marke the degree of any signe that the Sunne is in that day, whose quantitie you desire to know: set that degree iust in the Horizonte towards the East, and marke what degree of the Equinoctiall is in the Horizonte at the same time: then turne the Sphere West-ward, till the degree of the Sunne bee iust in the Horizonte againe in the West part, and marke then what degree of the Equinoctiall dooth lyght on the Horizonte

C 3

rizont in the East part, accompting truly howe many degrees bee betwixt those two degrees, which you haue marked, and that Arke of the Equinoctiall, is called the Arke of that day : which you may easily turne into howers, accompting 15. degrees to an hower, and for euery degree lesse than 15. accompting 4. minutes of an hower.

Example.

I set the Globe to the eleuation of 52. degrees, and consider the place of the Sunne, the 14. day of August, and find it to be by the Ephemerides, in the first beginning
of

of *Virgo*, therefore doe I set the beginning of *Virgo* in the very Horizonte, and then doe I see with it, the 137. degree of Equinoctiall in the same Horizonte, which I doe mark; afterward I turne the Sphere til the place of the Sunne, be in the Horizont on the West part, & the in the East part I mark the place of the Equinoctiall, which is 347. degrees, now abating 137. out of 347. there resteth the whole day Arke, which is 210. degrees, which maketh 14. howers: wherefore I conclude, that the night is but 10. howers, and both those times maketh iust 24. howers.

*An other way to find the same,
more easier.*

Example.

For London, the Pole of heauen
being rayfed there, 51. degrees and
34. minutes.

Turne your Meridian Circle 51.
degrees & 34. minutes, thē the Pole
of your Sphere is eleuated to the
Latitude of London, thus being fi-
nished.

The next Rule, to knowe the
day of the month you will practise
on.

That is to be found out in the
Horizonte

Horizonte Circle of the Sphere,
 where you shall find also, what de-
 gree the Sunne occupieth in the
 signe that day. Then turne the
 Circle of the Sunne, that the mid-
 dle body of the Sunne be brought
 right against the said degree, in the
 Zodiacke : then turne the whole
 Globe about West-ward, till the
 body of the Sunne bee right vnder
 the Meridian Circle, and there let
 him stay, till you haue remoued the
 index of the howerly Circle or
 Diall, precisely on 12. of the clocke
 at noone : then turne & bring the
 Globe backe agayne, to the East
 part of the Horizonte , where you
 first found out what degree of the
 signe

signe the Sunne was in that day;
 Then looke vpon the Dyall, on the
 North parte of the Sphere or
 Globe, & ye shal find what hower
 the Sunne ryseth: thys being done,
 bring him back again West-ward,
 toward the Meridian Circle, & it
 noteth the place of the eleuation
 of the Sunne euery hower, till hee
 be at his full height vnder the Me-
 ridian Circle, then it is sayd to bee
 in the very noone steede, for that
 place where you vse the Sphere
 for, then turn the Globe or Sphere
 frō the Meridian Circle, westward,
 and it sheweth the nūber of howers
 which he falleth from the Meridi-
 an height, till the tyme that he set-
 teth

teth vnder the Horizonte, and the index in the Dyall, will tell you the hower that hee setteth vnder the Horizonte that day.

So thus hauing regard to the former instructions, will tell you the tyme of the length of the dayes & nights, in all places of the world, throughout the whole yeere; Provided alwayes, that ye erect and set the degrees of the Meridian Circle, to the Latitude of the sayde place, where you meane to make your obseruation.

Yet by the way, I will giue you a Rule touching the Sunnes motion, in his Excentrick Circle.

The

The Excentrick Circle in the Sphere or Globe, beeing narrower on the one side than on the other, and hath his Center distant or deuided frō the Center of the world, and is described in the heauen of the Sunne, imagining a lyne from the Center of the Excentricke to the Center of the Sunne, making a complet reuolution at the proper motion of the Sunne.

In the other heauens, imagining a lyne from the Center of hys Excentrick, to the Center of the *Epicicle*.

The *Epicicle*, is a Circle or little Roundle,

Roundle, fixt in the depth of the Excentrick : in which, the Planee is fixed, and neere to hys Center is moued Circulerlie.

The *Auge*, is a poynt in the circumference of the Excentrick, neereſt vnto the Firmament : or it may bee ſayde, that the *Auge* is a poynt fartheſt diſtant from the Earth.

Aux, in the Greeke tongue is as much to ſay, as the greateſt Longitude or greateſt eleuation from the Earth.

The oppoſite of the *Auge*, is another poynt in the circumference of
of

of the Excentrick, neereſt vnto the Earth, and fartheſt diſtant from the Firmament.

And you muſt heere note and vnderſtand, the Sunne is not moued Regularly in the Zodiacke, making ſo much by his proper motion in one day, as in the other, becauſe his Regular motion is in reſpect of the Center of his own proper Sphere, or orbe wherein hee is moued, whoſe Center is diſtant without the Center of the world, towards the parts of *Cancer*: ſo that the greater part of his orbe Excentrick, is toward the ſeptentrionall part, where the Sunne paſſing by the ſeptentrionall ſignes, is more diſtant

distant from the Earth, and hath more to goe of hys orbe Excentricke, than beeing in the South signes: for, passing by the North signes, he tarryeth 9. dayes more, to describe the halfe of the Zodiake, than the other halfe toward the South part.

And for this cause, the Sunne is more swifter in his motion (in the Zodiake) one tyme, than another: for his motion in one day in the South signes, shall bee greater than it is in one day in the North signes.

And further it followeth, that the sayd vnequall moouing of the Sun oblique of the Zodiake, certayne
dayes

dayes of winter, with their nights, are longer, than certayne other of Sommer, with their nights: that is to say, that the day naturall in the winter, dooth surmount that in the Sommer, because the right ascension which aunswereth to one dayes motion of the Sunne, beeing in the South, is greater than the ascension for one dayes mouing, being in the North signes.

Next followeth the placing of the other sixe Plannets, in their true order in the Sphere.

These six Plannets, hauing each of them seuerall Spheres, and theyr
moti-

motions also seuerall, and vnlyke
 in tyme to any other: and there-
 fore they are called vvandering
 starres. These are carryed round
 about the world, by the vyolence
 of the first mouer, in 24. howers,
 that is, euery day once; yet they
 keepe their places in their Sphere,
 and haue their proper motions
 from West towards East.

The *Moone*, with her heauen
 or Sphere, by her proper motion,
 giueth her turne from the West to
 the East, in 27. dayes and 7. howers,
 with 45. minutes.

Venus, Mercury, and the Sunne,
 D i in

in a yeere, which is the space of 365. dayes, with 5. howers and 49. minutes.

Mars, in two yeeres. *Jupiter*, in 12. yeeres. *Saturne*, in 30. yeeres.

The eyght heauen, which is the Firmament or starry heauen, by his own proper motion is moued by the ninth heauen, vpon the beginning of *Aries* and *Libra*, and vpon these two poynts, accomplisheth hys Reuolution in seauen thousand yeeres.

This motion is called *Motus trepidationis*, (that is to say) the trembling motion, of *Access* or *recess*.

To

*To rectifie the 6. Planets, to goe in
theyr due courses about
the Sphere.*

Example.

Saturne, who is the slowest in motion of all the 7. Planets, the 30. day of Iune, 1592. he is found by the Ephemerides at noone, in his middle motion, to occupie the 16. degree, & 36. minutes of *Cancer*: then I turne the Sphere of *Saturne*, that the body or middle part of his starre or Character, be iust vnder the same degree in the signe noted in the Zodiacke, then mouing or tur-

ning the whole Globe about, from East to the West, sheweth not onely the howers of his ryfing and setting, with his Longitudes & Latitudes, but also, what part of the heauens he occupyeth, euery hower of the day & night, as by the Diall it appeareth in the Globe, if it bee set according to the true place of the Sunne.

Lykewise, *Iupiter* is to be sought out, what degree of the signe hee occupyeth the same day at noone, & obserue his Sphere in the same order.

Mars, the lyke; The *Sunne*, I haue shewed you the order before, Then *Venus* followeth, and *Mercury*,

cury, to be ordered and set each of them in theyr feuerall Spheres, then shall appeare euery one of them in theyr feuerall courses, euery moment of the day: as by the example of *Saturne* before is shewed.

Nowe to the Sphere of the *Moone*, whose motion in her Sphere is neereſt to the Earth; the obseruation of her, followeth.

The *Moone*, swifter in course than any of the other Planets, maketh her reuolution through the twelue signes, twelue times in a yeere oftner than the Sunne. And she is to be placed in lyke wise, according

cording to the former Rules, in the
 signe shee is in at noone, that day
 and hower which you will obserue
 the Globe or Sphere for, and for
 euery hower after, adde to her 30,
 minutes: and (without any great
 errour) shee noteth vnto you, her
 rysing and setting, the hower and
 place of the heaven, euery day and
 hower where she is: the chaunge,
 quarters, and full Moone, the ebbes
 and floods, euery hower through-
 out all the whole day and moneth:
 and so consequently throughout
 the whole yeere, without any great
 error; Also, the depriuing of her
 lyght by the Earth, in time of her
 Eclipses.

*To find out by the Instrument in the
Dyall, the age of the Moone, with her
change, quarters, and full: her aspects
with the Sunne: the ebbes & floods,
and other necessary Rules, apper-
taining to the Arte of Na-
vigation. &c.*

Marke at the Coniunction of
the Sunne and Moone, (it is sayde)
the chaunge of the Moone, is whe
the Sunne and shee meeteth toge-
ther, and then the Moone taketh
her lyght of the Sunne: and when
she is runne in her course, 24. how-
ers after the change, it is sayde that
she is a day olde; then turne the in-

dex of the Moone to the figure of
 1. And when she is two dayes old,
 turne the index of the Moone to
 the figure of 2. and so proceede, till
 she come to the figure of 7. and
 then it is sayd to be in the first
 quarter of the Moone: then at the
 figure of 15. shee is in opposition
 with the Sunne, then it is said to be
 a full Moone: then shee gathereth
 euery day in her decrease, towards
 the Sunne. And when she is 7.
 dayes past the full, then she hath
 lost half her roundnes of her light,
 and is sayd to be last quarter; and
 so gathereth euery day, neerer and
 neerer the Sunne, till she be depri-
 ued quite from her light, and then
 it

it is sayd to be at chaunge agayne,
 and a newe Moone : and after her
 chaunge , then her lyght begins to
 increafe agayne, euery 24. howers,
 48. minutes ; which yeeldeth in 15.
 dayes, 12. howers. And so much she
 is iust of the Sunne , at the time of
 the full Moone. And if you will
 marke the distances , betwixt the
 index of the Sunne, which poynts
 the howers in the Dyall, and in the
 index of the Moone: you shal find
 alwayes what distance the Sunne
 and Moone are a sunder; thys is
 called amongst the Marrines , the
 shifing of the Sunne and the
 Moone, & hereby they shall know
 theyr ebbes and floods , as appea-
 reth

reth in the vttermoſt part of the
Dyall : and alſo, the 32. poynts of
the Compas ſheweth the ſame.

Another Rule for the hower of
the two ſtarres afore-ſayde, called
the Guardes, and of ſome, called
Charles Wayne, or Charles Carte :
likning ſower ſtarres to ſower
wheeles, and the other three ſtarres
to three Oxen.

And the fiſt ſtarres I take for
my purpoſe, and declare at euerie
monethes end, at what hower they
are full Weſt, and the howers that
they are Weſt and by North, and
North-weſt, and North-weſt and
by North, and full North; and ſo
round

round about 24. howers.

Example.

JANUARY.

From the 2. day of *January*, to the 17. they are North-east, at 5. at night: so you must turne the former *Guarde*, that the thrid going from the same to the North starre, may fall iust vpon the North North-east poynt of the *Compas*, at 5. of the clocke at night: and then turn the *Globe* round about, and it noteth euery hower, and euery poynt in the *Compas*, that coast where they are situated, and
al-

also, what hower they rise and set vnder the Pole. And by this example put, you may proceede throughout euery moneth in the yeere, according to the tymes of theyr beeing, and euery hower in the same. As at 6. of the clocke at night, they are North-east and by North.

at 7. North-east.

at 8. East and by North.

at 9. Full East.

at 10. East and by South.

at 11. South-east.

at midnight, South-east and by South.

at 1. South-east.

at 2. South-east and by South.

at 3.

at 3. Full South.

at 4. South-west and by South.

at 5. South-west.

at 6. South-west and by South.

at 7. South-west.

From the 17. to the last, they are
North-east and by North at 5. at
night.

at 6. North-east.

at 7. East and by North,

at 8. Full East.

at 9. East and by South.

at 10. South-east

at 11. South-east and by South
at midnight, South South-east

at 1. South-east and by South

at 2. Full South

at 3. South-west and by South

at 4.

at 4. South-west,

at 5. South-west and by South

at 6. South-west

at 7. West and by South.

From the last to the 15. of *February*, they are North-east at 5. at after noone.

at 6. East and by North

at 7. Full East.

at 8. East and by South

at 9. South-east

at 10. South-east and by South

at 11. South-east

at midnight, South South-east and by South.

at 1. Full South

at 2. South South-west and by South.

at 3.

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- at 3. South-west
- at 4. South-west and by South
- at 5. South-west
- at 6. West and by South
- at 7. Full West

FEBRUARY.

*The howers of the two starres of
Charles Wayne.*

From the 15. to the 1. of *March*,
they are full East, at 6. at after
noone.

- at 7. East and by South.
- at 8. South-east
- at 9. South-east and by South
- at 10. South-east

at 11

at 11. South-east and by south

at midnight, full South

at 1. South-west and by south

at 2. South-west

at 3. South-west and by south

at 4. South-west

at 5. West and by South

at 6. Full West.

From the 1. of *March* to the 16. of *March*, they are East and by South, at 6. at after noone.

at 7. South-east

at 8. South-east and by south

at 9. South-east

at 10. South-east and by south

at 11. Full South

at midnight, South south-west and by south.

at 1.

- at 1. South south-west
- at 2. South-west and by south
- at 3. South-west
- at 4. West and by South
- at 5. Full West
- at 6. West and by North

MARCH.

*The howers of the two starres of
Charles Wayne.*

From the 16. to the 1. of *Aprill*,
they are South-east and by south;
at 7. at after noone.

- at 8. South South-east
- at 9. South south-east & by south
- at 10. Full South
- at 11. South southwest & by south

E 1

at mid-

at midnight, Southwest

at 1. South-west and by south

at 2. South-west

at 3. West and by South

at 4. Full West

at 5. West and by North

From the 1. of *Aprill*, to the 16.
they are South South-east, at 7. at
after noone.

at 8. South south-east & by south

at 9. Full South.

at 10. South south-west & by south

at 11. South south-west

at 12. South-west and by south

at 1. South-west

at 2. West and by south

at 3. Full West

at 4. West and by North

at 5.

65
at 5. North-west

APRILL

*The bowers of the two starres of
Charles Wayne.*

From the 16. of *Aprill* to the 2. of
May, they are full South, at 8. at af-
ter noone.

at 9. South southwest & by south

at 10. South south-west

at 11. South-west and by south

at midnight, South-west.

at 1. West and by South

at 2. Full West.

at 3. West and by North

at 4. North-west

From the 2. of *May* to the 18.

E 2

they

they are South South-west and by South, at 8. at after noone.

at 9. South South-west

at 10. South-west and by South

at 11. South-west

at midnight, West and by South

at 1. Full West.

at 2. West and by North

at 3. North-west

at 4. North-west and by North.

MAY.

*The howers of the two starres of
Charles Wayne.*

From the 18. of May to the 2. of June. they are South-west and by South, at 9. at after noone.

at 10.

at 10. South-west

at 11. West and by South

at midnight, Full West

at 1. West and by North

at 2. North-west

at 3. North-west and by North

From the 2. day of *June*, to the 18.
they are South-west, at nine at af-
ter noone.

at 10. West and by south

at 11. Full West

at 12. West and by north

at 1. North-west

at 2. North-west and by north

at 3. North-west

E s JUNE

J V N E.

*The howers of the two starres of
Charles Wayne.*

From the 18. of *June*, to the 4. of
July, they are West and by South, at
at 9. at after noone.

at 10. Full West

at 11. West and by north

at midnight, North-west

at 1. North-west and by north

at 2. North north-west

at 3. North northwest & by north

From the 4. of *July* to the 20. they
are full West at 9. at after noone.

at 10. West and by north

at 11. North-west

at mid-

69

at midnight, North-west and by
north.

at 1. North north-west

at 2. North north-west and by
north.

at 3. Full North

JULY.

*The howers of the two starres of
Charles Wayne.*

From the 20. of *Iuly*, to the 4. of
August, they are full West, at 8. at
night.

at 9. West and by north

at 10. North-west

at 11. North-west and by north

at midnight, North-west

at 1. North north-west and by
north.

at 2. Full North

at 3. North northeast & by north

From the 4. of *August* to the 20.
they are West and by north, at 8. at
after noone.

at 9. North-west

at 10. North-west and by north

at 11. North-west

at midnight, North-west and by
north.

at 1. Full North

at 2. North north-east and by
north.

at 3. North north-east

at 4. North-east and by north

AUGUST.

*The howers of the two starres of
Charles Wayne.*

From the 20. of *August*, to the 4.
of *September*, they are North-west,
at 8. at after noone.

at 9. North-west and by north

at 10. North north-west

at 11. North north-west and by
north.

at midnight, full north

at 1. North northeast & by north

at 2. North north-east

at 3. North-east and by north

at 4. North-east

From the 4. of *September* to the
19. they

19. they are North-west at 8. at after noone.

at 9. North north-west

at 10. North north-west and by north.

at 11. Full north

at midnight, North north-east and by north

at 1. North north-east

at 2. North-east and by north

at 3. North-east

at 4. East and by north

SEPTEMBER.

*The howers of the two flarres of
Charles Wayne.*

From the 19. of September to the
5. of

5. of *October*, they are North-west
and by north, at 7. at after noone.

at 8. North north-west

at 9. North northwest & by north

at 10. Full north

at 11. North northeast & by north
at midnight, North-east

at 1. North-east and by north

at 2. North-east

at 3. East and by north

at 4. Full East

at 5. East and by South

From the 5. of *October* to the 20.
they are North north-west, at 7. at
after noone.

at 8. North north-west and by
north.

at 9. Full north

at 10.

- at 10. North northeast & by north
 at 11. North north-east
 at midnight, north-east & by north
 at 1. North-east
 at 2. East and by north
 at 3. Full East
 at 4. East and by South
 at 5. South-east

OCTOBER.

*The howers of the two starres of
 Charles Wayne.*

From the 20 of October, to the 3.
 of Nouember, they are North north
 west at 6. at after noone.

at 7. North north-vest and by
 north

at 8.

- at 8. Full north
- at 9, North northeast & by north
- at 10, North north-east
- at 11, Northeast and by north
- at midnight, north-east
- at 1, East and by north
- at 2, Full East
- at 3, East and by South
- at 4, South-east
- at 5, South-east and by south
- at 6, South south-east

From the 3, of *November*, to the 18, they are North northwest & by north, at 6, at after noone.

- at 7, Full North
- at 8, North northeast & by north
- at 9, North north-east
- at 10, North-east and by north

at 11.

- at 11, North-east
 at midnight, East and by north
 at 1, Full East
 at 2, East and by South
 at 3, South-east
 at 4, South-east and by south
 at 5, South-east
 at 6, South south-east & by south

NOVEMBER.

*The howers of the two starres of
Charles Wayne.*

From the 18. to the 3, of *Decem-
ber*, they are full North, at 6, at af-
ter noone.

- at 7, North northeast & by north
 at 8, North north-east

at 9,

- at 9. North-east and by north
 at 10. North-east
 at 11. East and by North,
 at midnight, Full East.
 at 1. East and by South.
 at 2. South-east
 at 3. South-east and by South
 at 4. South-east
 at 5. South South-east and by
 South.
 at 6. Full South
 at 7. South South-west and by
 South

From the 3. of *December*, to the
 17, they are full North, at 5, at after
 noone.

- at 6. North north-east & by north
 at 7. North north-east.

at 8.

- at 8. North-east and by north
- at 9. North-east
- at 10. East and by North.
- at 11. Full East.
- at midnight, East and by South.
- at 1. South-east.
- at 2. South-east and by South.
- at 3. South South-east.
- at 4. South Southeast & by south
- at 5. Full South
- at 6. South southwest & by south
- at 7. South South-west

DECEMBER.

*The howers of the two starres of
Charles Wayne.*

From the 17. of December, to the
1. of

1. of *January*, they are full North,
at 4. at night.

at 5. North northeast & by north

at 6. North north-east

at 7. North-east and by north

at 8. North-east

at 9. East and by North

at 10. Full East.

at 11. East and by South

at midnight, South-east

at 1. South-east and by south

at 2. South South-east

at 3. South south-east & by south

at 4. Full South.

at 5. South Southwest & by south

at 6. South south-west

at 7. South-west and by South

From the 1. of *January* to the 16.

F 1

they

they are North North-east at 5. at
after noone.

at 6. North-east and by north

at 7. North-east

at 8. East and by north

at 9. Full East

at 10. East and by South.

at 11. South-east

at midnight, Southeast & by south

at 1. South South-east

at 2. South south-east & by south

at 3. Full South

at 4. South South-west and by
South.

at 5. South South-west

at 6. South-west and by south

at 7. South-west.

*A ready note in fewe words, for the
difference of howers, according to the distance
myles, from East to West vnder the
Equinoctiall.*

FIRST, you shall vnderstand,
that 15. myles difference from
East toward West, doth make the
Sunne rysing, the noone steed, and
Sunne setting, to be later by one
minute of an hower: & so 30. miles,
2. minutes: 120. myles, 8. minutes:
225. myles, 15. minutes: which is a
quarter of an hower. And he that
is ready in accompt of Arithma-
tique, may find it out by the Rule
of proportion. As for Example.

London hath Latitude 51. degree

F 2. and

and 30. minutes, or thereabouts, I
 traually East-wards from London
 2000. myles; My desire is, to know
 the difference of theyr Longi-
 tudes, and the time of theyr noone
 steeds, for when it is 12. of the clock
 with vs at London, 2000. myles
 East-ward from London, is then
 but 2. of the clock and 13. minutes
 at after noone. And 2000. myles
 West from London, it was then
 with them, but 10. of the clock and
 13. minutes in the fore noone: the
 difference of these 3. places, one
 from the other, is to bee founde
 by the Rules in Arithmatique, as
 followeth.

If 15. myles in Longitude, East-
 ward

ward from London giue one minute of time, what gyueth 2000 myles.

myles, 15.



1. minute
of time.

myles, 2000

133. 5.

I worke it in this manner, deuiding 2000 miles by 15 myles, and it yeeldeth 133. times 15. myles, and 1. third part of 15. miles, to be deuided into 15 parts. Now, allowe to euery 15. myles, one minute of tyme, (as you haue heard me say before) and reduce them into howers, in this manner as followeth.

60. minutes maketh a degree of the

F 3

Enui-

Equinoctial; so then deuide 13. by 60. minutes of time, & the Corient will be 2. and 13. will remayne: that is, 2. howers and 13. minutes difference, betweene that place & London. And in this wise may you worke by the Rules in Arithmaticque, to find the West Longitude from London.

There bee some persons that make a great obscuritie, in finding out the Longitudes in sayling East and West; a thing once knowne, & of no great importance, as ready to bee found out as the Latitudes. A little Briefe (therfore) I will giue you, to vnderstand the same skill.

Let the Marriner, Sayler, or other persons,

persons, provide him a perfect Watch, or Clock, arteficially made by a Clock-maker. Let him set the same by the hower of the day in that place you are in, and to come by the true place of the Sunne, your Astrolob quadrant crosse staffe, or other Instrument, will serue you to take the heighth of the Sunne, & to find out the true hower in euery seuerall Latitude, with the helpe of the Rules before. And the true hower beeing found of the day in this manner, sette your Clocke or Watch. Then trauell either by Sea or Land, and when you are 40. myles, or 60. more or lesse, distant of the place you went from, then

looke to your Clocke or Watch,
 howe many howers haue passed
 since you set on your iourney : then
 take your Quadrant or orther In-
 strument, & take the heighth of the
 Sunne in that place you are in; and
 if the time of the day taken with
 your Instrument, doe agree with
 your clock, be you sure your place
 is North or South, from the place
 you came from, and therefore haue
 the same Longitude and Meridian
 lyne; But if the tyme differ, sub-
 tract the one out of the other, and
 the difference turne in degrees and
 minutes of the Equinoctiall : and
 15. minutes of the Equinoctiall, ma-
 keth one minute of time, according
 vnto

vnto the Rules going before, you may thus knowe the Longitudes, difference of howers, and times, betwixt any two places East or Westward. The Latitudes are easily found out by the Altitudes of the North or South Poles, and also, by the Meridian heigh of the Sunne at noone.

Example.

I find the Sunne to possesse the 11. minute of *Geminie*: his heigh in the Meridian lyne at noone with vs heere at London, is 54, degrees and 10, minutes, and his declination is 15, degrees and 40, minutes:
now

nowe I substraſt the declination
out of the Sunnes heighth, & there
remayneth 39, degrees and 30, mi-
nutes, this I take from 90, degrees,
and I find the place in height 51,
degrees and 30, minutes; And this
you muſt beare in memory, that if
the Sunne haue South declinatiō,
you muſt adde it to the ſayde Alti-
tude: then adding or ſubſtracting
that number from 90, degrees, ther
ſhall remaine the true eleuation of
the Pole.

Alwayes beare this in memorie,
if the Sunne be on the South ſide
of the Equinoctiall lyne, it is called
South declination; if on the North
ſide, North declination; And thys
hath

hath a most singuler vse in the
Arte of Nauigation, and by it you
may finde out the heigth of the
Pole in all places wher you trauell.

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L
no
th
sh

¶ *Heere followeth the*
Degrees, called Putei, For-
tune, Lucidi, Tenebrofi, Vacui, Mas-
culini, and Feminei, Fumosi and A-
zamene, in all the 12. Signes of the
Zodiake. By this letter p. is ment Pu-
tei: for. signifieth Fortune: and a.
Azamene: this letter l. betokeneth
Lucidi: t. Tenebrofi: this letter v.
noteth Vacui: and m. Masculini:
this letter f. signifieth Feminei: and
this sillable fu. noteth Fumosi.

Aries

Aries.

Degrees,

1, t. m.

2, t. m.

3, t. m.

4, l. m.

5, l. m. p.

6, l. m.

7, l. m.

8, l. m.

9, t. f.

10, t. f.

11, t. m. p.

12, t. m.

13, t. m.

14, t. m.

15, t. m.

Aries.

Degrees,

16, t. f. p.

17, l. f.

18, l. f.

19, l. f. for.

20, l. f.

21, v. f.

22, v. f.

23, v. m. p.

24, v. m.

25, l. m.

26, l. m.

27, l. m.

28, l. m.

29, l. m. p.

30, v. m.

Taurus,

Taurus

Degrees,

- 1, f. t.
- 2, f. t.
- 3, f. t. for.
- 4, f. l.
- 5, f. l. p.
- 6, m. l. a.
- 7, m. l. a.
- 8, m. v. a.
- 9, m. v. a.
- 10, m. v. a.
- 11, m. v.
- 12, f. v. p.
- 13, f. l.
- 14, f. l.
- 15, f. l. for

Taurus

Degrees,

- 16, v. f.
- 17, v. f.
- 18, v. m.
- 19, v. m.
- 20, v. m.
- 21, l. m.
- 22, l. f.
- 23, l. f.
- 24, l. f. p.
- 25, l. m. p.
- 26, l. m.
- 27, l. m. for
- 28, l. m.
- 29, t. m.
- 30, t. m.

Gemini

Gemini,

Degrees,

- 1, l. f.
- 2, l. f. p
- 3, l. f
- 4, l. f
- 5, t. f
- 6, t. m
- 7, t. m
- 8, l. m
- 9, l. m
- 10, l. m
- 11, l. m. for
- 12, l. m. p
- 13, v. m
- 14, v. m
- 15, v. m

Gemini,

Degrees,

- 16, v. m.
- 17, l. f. p
- 18, l. f.
- 19, l. f
- 20, l. f.
- 21, l. f.
- 22, l. f.
- 23, t. m
- 24, t. m.
- 25, t. m.
- 26, t. m. p
- 27, t. m
- 28, v. f
- 29, v. f
- 30, v. f. p

Cancer

Cancer.

Degrees;

1, l. m. for.

2, l. m. for

3, l. f. for

4, l. f. for

5, l. f

6, l. f

7, l. f

8, l. f

9, l. m. a

10, l. m. a

11, l. f. a.

12, l. f. a. p

13, t. m. a

14, t. m. a

15, v. m. a. for

Cancer.

Degrees,

16, v. m

17, v. m. p

18, v. m

19, fu. m

20, fu. m

21, l. m.

22, l. m

23, l. m. p

24, l. f.

25, l. f

26, l. f. p

27, l. f.

28, l. f

29, t. v

30, t. v. p

G

Lio,

Leo.

Degrees,

1, t. m.

2, t. m. for

3, t. m

4, t. m

5, t. m. for

6, t. m. p

7, t. f. for

8, t. f

9, t. m

10, t. m

11, fu. m

12, fu. m.

13, fu. m. p

14, fu. m

15, fu. m. p

Leo.

Degrees,

16, fu. f.

17, fu. f

18, fu. f. a

19, fu. f. for

20, v. f. fu.

21, v. f.

22, v. f. p

23, v. f. p

24, v. m

25, v. m. a

26, v. m. a

27, l. m.

28, l. m. p

29, l. m

30, l. m

Virgo.

Virgo,

Degrees

1, f. r.

2, f. r.

3, f. r. for

4, f. r.

5, f. r.

6, f. r.

7, f. l.

8, f. l. p

9, m. v

10, m. v

11, m. l

12, m. l

13, f. l. p

14, f. l. for

15, f. l.

Virgo,

Degrees

16, f. l. p

17, f. fu

18, f. fu

19, f. fu

20, fu. for

21, m. fu. p

22, m. fu

23, m. v

24, m. v

25, m. v. p

26, m. v

27, m. v

28, m. r.

29, m. t

30, m. t

G 2

Libra

Libra,
Degrees

1, l. m. p.

2, l. m. p.

3, l. m. for

4, l. m

5, l. m. for

6, t. f

7, t. f. p

8, t. f

9, t. f

10, t. f

11, l. f

12, l. f

13, l. f

14, l. f

15, l. f

Libra
Degrees,

16, l. m.

17, l. m

18, l. m

19, t. m |

20, t. m. p

21, t. f. for

22, l. f.

23, l. f

24, l. f

25, l. f

26, l. f

27, l. f

28, v. m

29, v. m

30, v. m. p

Scorpio,

Scorpio,
Degrees,

- 1, t. m.
- 2, t. m
- 3, t. m
- 4, l. m
- 5, l. f. for
- 6, l. a. f
- 7, l. f. for
- 8, l. f.
- 9, v. f. p
- 10, v. f. p
- 11, v. f
- 12, v. f
- 13, v. f
- 14, v. f
- 15, l. m

Scorpio,
Degrees,

- 16, l. m
- 17, l. m
- 18, l. f. for
- 19, l. a f
- 20, l. f. for
- 21, fu. f
- 22, fn. f. p
- 23, v. f. p
- 24, v. f
- 25, v. m
- 26, v. m
- 27, v. m. p
- 28, t. m
- 29, t. a. m
- 30, t. m

Sagittarius

Sagittarius

Degrees,

1, l. m. a

2, l. m

3, l. f

4, l. f

5, l. f

6, l. m

7, l. m. a p

8, l. m. a

9, l. m

10, t. m

11, t. m

12, t. m. p

13, l. f. for

14, l. f

15, l. f. p

Sagittarius

Degrees,

16, l. f

17, l. f

18, l. f. a

19, l. f. a

20, fu. f. for

21, fu. f.

22, fu. f

23, fu. f

24, l. f. p

25, l. m

26, l. m

27, l. m. p

28, l. m

29, l. m

30, l. m. p

Capricor.

Capricor.

Degrees,

1, t. m

2, t. m. p

3, t. m

4, t. m

5, t. m

6, t. m

7, t. m

8, l. m

9, l. m

10, l. m

11, fu. m.

12, fu. f. for

13, fu. f. for

14, fu. f. for

15, fu. f.

Capricor.

Degrees

16, l. f.

17, l. f. p

18, l. f.

19, l. f.

20, t. m. for

21, t. m

22, t. m. p

23, v. m

24, v. m. p

25, v. m

26, t. m. a

27, t. m. a

28, t. m. a p

29, t. m. a

30, t. m

Aquary

Aquary.

Degrees

- 1, fu. m. p
- 2, fu. m
- 3, fu. m
- 4, fu. m
- 5, l. m
- 6, l. f
- 7, l. f. for
- 8, l. f
- 9, l. f
- 10, t. f
- 11, t. f
- 12, t. f. p
- 13, t. f
- 14, l. f
- 15, l. f

Aquary.

Degrees

- 16, l. m. for
- 17, l. m. for
- 18, l. m. a
- 19, l. m. a
- 20, l. m. for
- 21, l. m
- 22, l. f. p. v
- 23, v. f
- 24, v. f. p
- 25, v. f
- 26, l. m
- 27, l. m
- 28, l. f
- 29, l. f. p
- 30, l. f

Pisces.

Pisces.

Degrees

1, t. m.
 2, t. m.
 3, t. m.
 4, t. m. p
 5, t. m.
 6, t. m.
 7, l. m.
 8, l. m.
 9, l. m. p
 10, l. m.
 11, l. f.
 12, l. f.
 13, t. f. for
 14, t. f.
 15, t. f.

Pisces.

Degrees

16, t. f.
 17, t. f.
 18, t. f.
 19, l. f.
 20, l. f. for
 21, l. m.
 22, l. m.
 23, v. m.
 24, v. f. p.
 25, v. f.
 26, l. f.
 27, l. f. for. p.
 28, l. f. p.
 29, t. m.
 30, t. m.

T.

To know the place of the Sunne, by the
Rule of memorie: And to know in what
degree the Sunne is, without re-
spect of minutes.

Beare in memorie these numbers
that heere-after followeth. ii.

10. 11. 10. 11. 12. 13. 14. 13. 14. 12. 12.

The first 10, standeth for *January*,
the second for *February*, with their
signes, & so the rest; And to know
in what degree the Sun is, you shal
take away the dayes that are appli-
ed to euery moneth, according to
the said numbers of the dayes, for
the which you desire to know the
place of the Sunne, and in them
that remayn, in so many degrees is
the Sunne, of the signe into which

it

it entereth that moneth. And if the
 dayes past of the moneth, shall bee
 lesse then the dayes applyed to the
 same moneth, you shall ioyne 30.
 with those dayes past of the mo-
 neth, & of the Sunne that amoun-
 teth, you shall take away the daies
 applyed to the sayde moneth, and
 the rest shall be the degrees, in the
 which the Sunne shall be, of the
 signe of the moneth past. As for
 example.

Moneth.

Moneth, Degrees, Signas.

| | | |
|---------------|------------|--------------------|
| <i>Ja.</i> | <i>11.</i> | <i>Aquarius</i> |
| <i>Fe.</i> | <i>10.</i> | <i>Pisces.</i> |
| <i>Ma.</i> | <i>11.</i> | <i>Aries</i> |
| <i>Ap.</i> | <i>10.</i> | <i>Taurus</i> |
| <i>Mai.</i> | <i>11.</i> | <i>Gemini</i> |
| <i>June.</i> | <i>12.</i> | <i>Cancer</i> |
| <i>July.</i> | <i>13.</i> | <i>Leo</i> |
| <i>Au.</i> | <i>14.</i> | <i>Virgo</i> |
| <i>Sep.</i> | <i>13.</i> | <i>Libra</i> |
| <i>Octob.</i> | <i>14.</i> | <i>Scorpio</i> |
| <i>Ne.</i> | <i>12.</i> | <i>Sagittarius</i> |
| <i>De.</i> | <i>12.</i> | <i>Capricornus</i> |

The 12. day of *October*, taking away 14, that were applyed, remaineth 28. degrees of *Scorpio*, where the Sunne is,

An

Another Example.

The sixt of *December*, which are
 lesser then 12. which is applied vn-
 to it, if we ioyn 6. to 30. which are
 the daies of the moneth next afore,
 they make 36. and from them wee
 take away the 12. & there rest 24.
 degrees is the Sunne of the month
 before, which is *Sagittarius*.

*A Rule to know when the Sunne en-
 treth into euery of the 12. Signes.*

And that wee may in the yeeres
 to come, know the day, hower, and
 minute, in the which the Sun en-
 treth

treth into euery signe, we will follow this order; vpon the day, howers, & minutes, that the Sunne entereth into euery signe, the yeere 1545. we must add for euery yeere 5. howers and 49. minutes, which with the 365. dayes which euery yeere containeth, shalbe the time in the which the Sun accomplisheth his resolution. And because that in the yeere of the Bebysextile or Leap-yeere, is added to *February*, 1. day more to his 28, which we haue once in 4. yeeres, from 6. to 6. howers; if we shal take from the Computation, that we haue given turning one day backward, as shall be in the yeere 1548. and vppon that remay-

remained shall return in the yeere following, of 1549 to add 5; howers 49 minutes, and as much more exactly betwixt yeere following shall be a certaine Rule for euer.

And it is to be noted, that the degrees and minutes which we haue touched before, are properly for the city of Cadix. And if we desire to apply the for other cities or places more Eastward, the for euery 15 degrees that they are distant from Cadix, in Longitude, we must add one hower, And if for the Cities or places more westward in like manner, for euery 15. degrees, we must take away one hower, by reason of the course of the Sun, by his Rapte mouing

HO

moving frō the East to the West.
For it is certain, that when with vs
in *Cadiz*, it is 12, howers of the clock
to them that are 15. degrees East-
warde from vs, it is one of the
clocke : and to them that are from
vs 15. degrees towards the West, it
is 11. of the clocke. And thus may
you apply it to euery seueral Lon-
gitude East or West, gyuing to e-
uery 15. miles, one minute of tyme
according to the other Rules in A-
rithmatique specified.

FINIS.

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